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Cooperative Learning in Elementary Science Classrooms

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ABSTRACT

This study investigated teachers' beliefs and practices of cooperative learning, and strove to determine whether their observed teaching practices reflected their stated beliefs. Findings of the study revealed that teachers understood cooperative learning to mean small groups of students working together to accomplish a particular assignment. The teachers' stated conceptions about cooperative learning were congruent to their observed practices. The studied teachers' observed practices differed from those of noted scholars regarding the importance of the interdependence element of cooperative learning.

Introduction

Many of today's educators learned what teaching was from personal experience – as students in K-12 or college classrooms (Goodlad, 1994; Wise, 2001). Observations in classrooms in several states indicated that whole group direct instruction seems most frequently employed at the K-12 level, while lectures continue to be the most popular method of instruction chosen by post-secondary instructors (Brinkley, et. al, 1999). A question that comes to mind is why teachers are not using more cooperative and collaborative teaching strategies, especially given the amount and consistency of supportive research that presently exists? One answer that might follow is that few of today's classroom teachers and teacher candidates have had extensive elementary, middle or secondary school teacher preparation coursework or in service professional development in using cooperative learning formats and are thus, not knowledgeable about how to structure the learning. Another is that when they have tried cooperative learning, they were removed from their comfort zones (as perhaps were the students) to such a degree that they have tended to fall back into more familiar teaching and learning routines.

While attempting to complete an assignment that required the use of cooperative learning techniques, several undergraduate teacher education students reported that the teacher with whom each worked in their field placement schools indicated that he or she did not use cooperative learning in his or her classroom, or that it did not work after trying it – once. This was problematic in terms of undergraduate students learning to connect theory and practice, and in experiencing current best practices in instruction. The author wondered what practicing teachers understood cooperative learning to be – conceptually, and how they used cooperative learning in their classrooms.

Thus, this study was conducted in spring 2000 to answer the following questions. (1) What does the term "cooperative learning" mean conceptually to fourth and fifth grade teachers? (2) How do the teachers who use cooperative techniques implement them? (3) Was the implementation congruent with their stated conceptions? (4) Why do the fourth and fifth grade teachers implement cooperative strategies? (5) What specific structures do these teachers use when implementing a cooperative learning lesson?

Cooperative learning and Constructivism

Cooperative learning challenges students, together with peers, to use information in new ways and to create new understanding. Cooperative learning has roots in constructivism and allows students to take a measure of control in their learning. The deflection of responsibility from the teacher to the pupil encourages peer-led discussions whereby students begin to construct their knowledge in accordance with their prior experiences and knowledge (Perkins, 1999).

Constructivism approach encourages students to generate their learning based on a framework of discussion and discovery in concert with other learners. Learning occurs more by active engagement with materials and creating new connections between pieces of data rather than by passively receiving a continuous stream of facts and other information.

Cooperative learning and its components

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Cooperative learning, as Johnson and Johnson (1993) define it, "is that which involves students working together to accomplish common goals" (p. 6). According to Slavin (1991), cooperative learning is a "humanistic" approach that encourages social interactions (p. 89). He suggests rewards, individual accountability, and equal opportunities for each team member to contribute to the success of the team as basic components that comprise cooperative learning. Kagan (1985) maintains that cooperative learning methods have particular elements that include the "division of the whole class into small teams of three to five students each, who were positively interdependent upon one another by the systematic application of principles of reward and/or task structures" (p. 67).

The cooperative learning components suggested by these scholars include individual accountability, the development of social and communication skills, and positive interdependence, (Johnson, Johnson, & Holubec, 1993, 1994; Kagan, 1994, 1995, Sharan & Sharan, 1994, and Slavin 1985). Johnson and Johnson (1991) further state that student interdependence (i.e., each student having a particular role within the group) resulted in students achieving at higher levels. Johnson, Johnson, and Holubec (1993, 1994) add group processing to this list.

Cohen, Lotan, Whitcomb, Balderrama, Cossey and Swanson (1994) indicate that no single child is fully capable of performing all of the tasks required by a particular assignment or project. They further state that students working cooperatively share knowledge and learn from each other.

It is prudent to offer a working definition of the cooperative learning components as suggested by these scholars and used by the author for purposes of this study.

Positive interdependence: This is most commonly defined as having specific roles for each participant that are necessary for the group to work toward the goal(s) set by the teacher. Ideally, these roles are unique for each member of the group and it is vital that each member perform the assigned task.

Individual accountability: Teachers assess the academic learning or the attainment of social skills by formal or informal methods using subjective or objective measuring instruments. Generally, this is a test, homework, or observation of social skills demonstrated in a group setting.

Social skills: This component's focus is on the participants' ability to share materials and workspace. Participants also demonstrate consideration for others by keeping their voices at a reasonable level.

Communication skills: Participants demonstrate the ability to discuss topics, to disagree without causing arguments, and to resolve conflicts peacefully. Participants use conflict resolution strategies as necessary.

Group processing: Johnson, Johnson, and Holubec (1990) add this to the above list. This oral or written procedure allows the students to tell the teacher how well the groups worked together or report any problems. The teacher might discuss the completed cooperative activity with the students to gain their input that way, or ask for the information in written format. Allowing students to write their comments permits confidentiality. Teachers might use information gained from group processing when forming groups for future projects, grading, or to address deficiencies in acceptable social skill demonstration.

Literature Review

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A 1999 perusal of the websites for the state departments of education in each of the 50 states revealed that educational initiatives for public education already on the books or proposed for review in many states required (at that time) an emphasis on student achievement. Cooperative learning research indicates increased achievement as one consistent benefit of this instructional strategy.

Fuchs, Fuchs, Kazdan and Allen (1999) studied the use of helpful behaviors via Peer-Assisted Learning Strategies (PALS). Student pairs read to each other and received points based on the completion of reading activities and the demonstration of "appropriate tutoring behavior". Each student pair contained a high achieving partner and a low achieving partner. The students worked for three, thirty-five minute periods each week for the twenty-one weeks of the study. These researchers found that those students who gave the most help also experienced the highest gains in reading comprehension performance. This finding suggests that teaching is the best way of learning.

Asking students to discuss or manipulate material increases the number of learning modalities involved. Gardner (1993a, 1993b, 1999) asserts that not all students learn in the same way, and that teachers who present a particular concept using a variety of formats successfully teach more students. Additionally, different modalities offer not only the possibility of reaching previously untaught students, but can reinforce students' previous learning. It follows that increased student involvement with a concept via a variety of techniques and sensory stimuli that may include traditional activities, cooperative learning techniques, or other group activities increases familiarity. This leads to increased evidence of achievement when the teacher assesses the content knowledge (Mulryan, 1995; Sternberg and Berg, 1992).

Mulryan (1995) studied 48 fifth and sixth graders' responses during cooperative learning exercises to determine the level of student involvement and participation in math. Mulryan analyzed the time the students spent on-task and found more quality on-task behaviors occurred during episodes of cooperative learning. Her analysis indicated that high achievers appeared to respond well to cooperative learning directives, but low achievers did not. Passive girls, especially the low-achievers, appeared to gain less from the experience.

Gillies and Ashman (2000) studied academic and social gains made by 22 inclusion students and 130 general education students who were tested and reading at least one year below grade level. They placed students in both structured and unstructured group activities. The structured group received training in small-group interpersonal and social behaviors in an attempt to promote positive team interactions and cooperation while the unstructured group received no such training. Gillies and Ashman concluded that the structured groups had a higher rate of academic achievement and cooperative or on-task behaviors than their counterparts did in the unstructured groups. .

McManus and Gettinger (1996) wondered about students' reactions to cooperative learning. They studied 26 teachers from the same school district and 38 students enrolled in classrooms taught by two third grade teachers. During the six-week observation period, each classroom had four groups of four or five students each for the nearly daily, unspecified, cooperative exercises. Students in this study indicated to the authors that they learned cooperatively nearly every day and that the cooperative

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activity chosen by their teacher was often in association with language arts. The authors reported that the students rated academic benefits highest. More students indicated a preference for cooperative learning activities over individual activities but they also admitted that sometimes their on-task behavior declined. Students liked the ability to work with friends, but did not enjoy the occurrences of social conflict.

Holloway (1993) studied the perceptions that a fifth-grade teacher and her students have about *cooperation* within the context of cooperative learning. Through formal and informal discussions, Holloway found that the teacher thought that student learning through cooperative techniques was like a ripple effect. In other words, one piece of information leads to another, but her students misunderstood this point entirely. Her students thought that their own cooperation caused fellow students to cooperate. The students felt it was more like setting a good example and hoping others follow. The students' definitions centered on active behaviors while the teacher's definition involved concepts and shared learning.

Antil, Jenkins, Wayne, and Vadasy (1998) studied teachers who reportedly use cooperative learning. The authors surveyed 85 elementary teachers and then subsequently interviewed 21 of the surveyed teachers. Through the interviews, the authors studied the cooperative techniques that teachers employed and compared them with criteria found in the literature. They found that the teachers did not see a parochial way of using a particular cooperative strategy, but rather adapted the strategies they knew to fit their personal teaching style. Many of the participants in their study indicated that cooperative learning was a vehicle to improve both academic learning goals and social skills however their use of established structures was inconsistent with the notions of noted cooperative learning scholars.

A limited amount of literature exists discussing the conceptions that current teachers hold and their practice relative to cooperative learning. This study explored this area.

Methodology

Qualitative naturalistic inquiry allows a researcher to study the complexities of phenomena by observing, questioning, listening, and reflecting about specific observations (Glesne & Peshkin, 1992). Naturalistic inquiry provided trustworthiness via lengthy investigations to provide scope, persistent observations to provide depth, and triangulation to provide similar data through several sources (Lincoln & Guba, 1985). This study involved observations of and interviews with teachers to determine the conceptions held by teachers, their use of particular teaching strategies, and the degree of congruence between the teachers' conceptions and practice of cooperative learning and the writing of the scholars. These indicators could not be quantified, and thus required the use of qualitative research techniques.

The author interviewed and observed six Midwestern United States classroom teachers in action on three occasions. She scheduled observations and interviews at the teachers' convenience, with most of the interviews occurring immediately following an observation.

Four elementary school principals granted permission to the author to contact fourth and fifth grade teachers in their respective schools. Teachers received introductory letters and emails as recruiting tools. Teachers interested in participating in the study completed a demographic information sheet. The researcher and teachers

discussed the study and agreed to the visitation dates. Then she mailed a formal consent form to the teachers.

The six teachers represented a variety of demographic categories. Two teachers taught in a private Christian school and four were in public schools. Four teachers were female. Two teachers taught fifth grade while four taught fourth grade. Teaching experience ranged from a first year teacher to two teachers who had six years elementary teaching each. Five of the teachers were in their 20's while one was in his early 50s. All six had attained teacher certification in the traditional manner and three of the teachers hold a master's degree. School populations ranged from rural to inner city.

The observations occurred in the teachers' classrooms at each teacher's convenience. The only requirement was that the teachers teach science and use cooperative learning techniques during the observation. The study involved fourth and fifth grade teachers teaching science in order to provide an unambiguous focus, subject-matter consistency across all of the observations, and to limit the size of the study. Each of the teachers claimed at the outset to use cooperative learning in their teaching of science and agreed to use cooperative techniques during the scheduled observations.

The author did not promote any specific cooperative learning strategy. She took extensive field notes and wrote them more fully after leaving the field. The researcher used a set protocol to conduct interviews with the teachers that followed each observation. Sample questions appear in the chart below. This p[illegible]rn was repeated twice for a total of three observations and three interviews with the teachers.

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Chart 1 Sample Interview questions

First Interview:
How confident were you with cooperative learning techniques and your ability to use them effectively?
How do you determine the effectiveness of the cooperative techniques?
Do you anticipate that you will continue to use cooperative techniques?
Second Interview:
Tell me what you think of when I say the words, "cooperative learning."
From where did these ideas come? (Books, professors, colleagues, in-services)
Are there any barriers to implementing cooperative learning that you have experienced?
Has *your practice* changed in relation to cooperative learning? What has changed?
Do you always use the same strategies or structures for cooperative learning?
Why do you use cooperative learning? What do you hope it will do for the student(s)?
Third Interview:
Describe your philosophy of teaching.
How would you describe how children learn? What needs to happen for children to learn?
What do you do that facilitates that learning?
How does cooperative learning fit into how children learn? How does cooperative learning fit with your facilitation of their learning?
How do you assess the effectiveness of the *cooperative learning model* compared to another instructional model?

The first interview averaged an hour in length; the second averaged 45 minutes, while the third averaged 30 minutes. The research project took place in the spring semester of 2000 and took approximately three months to complete a cycle of three observations and three interviews with five of the teachers. The school year ended before the third observation of and interview with the sixth teacher could be accomplished. Therefore, 17 observations and 17 interviews comprised the data set

The author audio taped the interviews then transcribed and coded the information as soon after the visits as possible, and no later than that same evening to preserve the nuances of the interview. Commercially available voice recognition software sped transcription. Additional codes referring to emerging themes were entered for current and previous interviews throughout the process.

Member checking performed after the conclusion of the third interview with each teacher provided confirmation of the interview data. Lincoln and Guba (1985) refer to member checking as a process allowing interview participants to examine the printed interview transcripts to establish truthfulness of the transcription.

After completing the three interviews with each participant, the teachers received a copy of the completed transcripts of their interview. Each teacher read the interview transcripts and clarified or added additional comments as necessary then returned the transcripts via an enclosed, stamped, envelope. Only one participant added additional comments to clarify her thoughts and the author edited her notes accordingly.

Participants

Mr. Black earned a bachelor's degree in elementary education approximately 30 years ago and taught for several years immediately upon finishing his degree. He then spent a number of years away from the elementary classroom, but he returned three years before the research project. Mr. Black said that his concept of cooperative learning stemmed from his musical background. He saw himself as the conductor of a symphony using the strengths of various groups within the room, and he believed that all of the sections must cooperate for the whole project to work. Mr. Black taught at a private urban school with an enrollment of 200 students in grades 4-6. Students in this school were primarily of upper-middle class Caucasian families. His class contained 20 fourth grade students. Mr. Black said the following to express his point of view regarding cooperative learning "[it] is a lot more work because you must organize everything. I am an organized person and you have to be organized to teach cooperative[ly]" (Ransdell, 2001).

Ms. Brown was a first year teacher and very careful about structure when using cooperative techniques. She managed her 28 fifth grade students with an easy rapport. She reported that her ideas about cooperative learning came from her college coursework and from her student teaching experience. The public school where she taught was suburban with an enrollment of 640, mostly Caucasian, students in grades K-5.

Mr. Greene was a confident teacher who had complete control of the classroom and respect from his students. He claimed that he learned about cooperative learning as an undergraduate student, but that he did not feel his college professors emphasized it enough. He indicated that the message, received from his professors, was that teaching cooperatively was the exception to the rule, rather than the rule itself. Mr. Greene taught 19 fifth grade students and worked with Mr. Black at the same small

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private urban school having an enrollment of primarily upper-middle class Caucasian families.

Ms. Orange was a second year teacher who taught four sections of fifth grade science. She claimed that her ideas about cooperative learning came from her college coursework. Ms. Orange said her suburban public school had 571 students in grades K-5. The ethnic breakdown was 45% African American, 5% Hispanic, and 50% Caucasian. Ms. Orange reflected about her orientation to cooperative learning and said during the first interview, "I don't feel there was a lot of support out there for cooperative learning. ...I feel like I was thrown in and told to go for it." (Ransdell, 2001)

Ms. Peach had been teaching fourth grade for four years at the time of this study. She could not identify the source of her ideas about cooperative learning. She said she understood the words independently, but said her concept of cooperative learning evolved from her earlier teaching experiences. Ms. Peach emphasized the team concept in her classroom by seating the students in groups of five students and using the word "team" as much as possible when referring to the groups. Ms. Peach described her public school as "rural, but in town." Of the 651 students in the school, less than 7% were minority students. She emphasized the following during her third interview:

> I think it [cooperative learning] is something that happens naturally with me. There were things that I want to refine as I do every year. It is a learning process for me and I want to make it more beneficial for the children. (Ransdell, 2001)

Ms. White was a second year teacher. She described her school as rural with an enrollment of 400 K-5 students. Approximately 95% of the students in this public school were Caucasian, 2-3% were African American, and 1-2% were Hispanic. Ms. White attributed her concept of cooperative learning to the idea of being a life-long learner. She argued that people needed to be able to work together in society and cooperative learning offered students those skills. Ms. White stated that she was not entirely comfortable with cooperative learning (Ransdell, 2001).

Results

What does the term "cooperative learning" mean conceptually to fourth and fifth grade teachers?

To ascertain the teachers' conceptions of cooperative learning, the teachers answered the same series of interview questions to help determine what a typical cooperative learning lesson might look like in that teacher's classroom. Teachers mentioned small groups of two to six students per group with four students per group being the optimum number. Ms. Peach said, "I think of kids working together in a group. Cooperative means working together so [that means] that one person is not doing all of the work. No one sits back and watches the others do the work, (Ransdell, 2001). Only Ms. Orange said that she preferred partner or trio activities. Ms. Orange said,

> "... Some people think groups of four, but I don't have a pre-selected number of group members in my head. I often think partners or threes. ... I think there are people who get stuck in the rut having four or five people per cooperative group. I don't agree with that; I think anytime children are discussing, they are learning and it is cooperative learning," (Ransdell, 2001)

Mr. Black and Ms. Orange were two of the teachers who mentioned the need for structure, and that cooperative learning activities always had a specific task for the

students to accomplish. Ms. Orange said, "If I don't give them enough structure within the groups, it fails. I have had some projects fail badly because of the lack of structure. I didn't assign roles at the beginning of the year," (Ransdell, 2001). The most frequently selected cooperative learning tasks mentioned by these practitioners were games that reviewed material and hands-on projects such as science experiments.

All teachers mentioned that the cooperative groups in their respective classrooms performed the same activities simultaneously. Mr. Black and Ms. Peach also mentioned that their respective students might perform specific tasks at various stations within the room. The teachers reported they learned about cooperative learning during their undergraduate college days.

How do the teachers who use cooperative techniques implement them?

The teacher interviews and classroom observations revealed clues about how the teachers routinely incorporated cooperative learning into their curriculum. Five of the six observed teachers divided the students into groups of two to six students each with four students per group being the norm. Mr. Greene, Ms. Orange, Ms. Peach and Ms. White grouped the students into "tables" of four to six students. Ms. Brown did not seat her students in groups, but had a pocket chart in which the students' names were divided into groups. The students went to particular placed in the room for cooperative activities. These procedures usually determined the groups for cooperative learning and limited or removed the need to assemble new groups for each cooperative learning event, although some of the teachers made adjustments as necessary. The sixth teacher, Mr. Black, did not assign seats for his students, but claimed that the students usually sat in the same places each day. By default, group membership in his classroom stayed the same.

The teachers grouping techniques agreed with findings by Schmuck & Schmuck (1997) who stated that human nature is such that we tend to be hesitant when in a new group. In other words, it takes time for feelings of inclusion and belongingness to develop, and stability of a group's membership helps to create a more agreeable classroom environment.

All six teachers asserted that they favored heterogeneous groupings and felt the students learned better. Interview transcripts indicated that criteria used to create groups included scholastic ability, leadership skills possessed by each student, or their social skills. The teachers' declarations suggested congruence with findings by Johnson and Johnson (1991) who emphasized that heterogeneously grouped children learn better than do homogeneously grouped learners.

Teachers in this study did not appear to fully share the scholars' opinions regarding their use of roles and routinely left out this aspect of cooperative learning, often preferring not to distribute roles, or assign a role to only one member of a group. However, positive interdependence or individual roles was the only cooperative learning component consistently *mentioned by each interviewed teacher* when describing his/her concept of cooperative learning. This finding echoes that of Antil et al., (1998) who say teachers modify or eliminate various components of cooperative learning as they see fit.

All six teachers stated in interviews that they often used cooperative learning to review for upcoming content tests and that the students knew that they would be assessed via a chapter or unit test. The assessment would take the form of individual

student grades rather than group grades. This appeared to be the case during all observations where students reviewed material.

The single exception observed was Ms. Orange who told her students that each child should write some of their group's answers and as proof of that, she would look for the handwriting of each person. She told them that she planned to grade the answer sheets later and each member of the group would receive the same grade.

The observations occurred during the spring semester and the teachers appeared to have established desired student behavior for cooperative learning groups because the teachers issued few reminders to the students either before or during cooperative activities. The author observed that the students remained on-task during the cooperative learning activities by leaning into their groups, kneeling on chairs to see the project at hand better, helping each other handle the materials, talking quietly with their teammates, pointing to passages or pictures in books, and writing on papers. According to research by Slavin (1983) and Johnson, Johnson, and Holubec (1994), cooperative learning strategies increase the likelihood of on-task behavior.

Johnson, Johnson, and Holubec (1993, 1994) advocate group processing. One way of conducting group processing is to have students complete a form confidentially telling the teacher how well each group member contributed to the project. Variations of this procedure exist; other teachers might conduct group discussions or ask students to write a short paragraph describing how their group worked together. One teacher, Ms. White, asked her students to complete a survey that told her, confidentially, how their group members performed. This was the only instance of group processing observed by this researcher during this project. Of the remaining five teachers, Mr. Black, Mr. Greene, and Ms. Orange claimed not to have heard of the technique. Ms. Brown kept anecdotal notes and Ms. Peach did not like to use group processing for fear students would rate unfairly those peers whom they disliked.

The teachers spoke about their perceived obstacles to the successful implementation of cooperative learning. Transcripts revealed that teachers felt cooperative learning necessitated extensive planning and additional time to implement than other means of instruction teachers currently used. Space for storage of supplies and for students to work was a second concern expressed by several teachers. Certainly in classrooms where students actively engage in learning, storage space could be a problem whether or not teachers incorporated cooperative learning into their teaching. Thirdly, they noted a lack of materials, adult assistance and the teacher's level of physical energy by the end of the day as perceived barriers. Finally, teachers revealed that individual or cultural conflicts between students sometimes stood in the way of successfully carrying out cooperative learning activities (Ransdell, 2001).

The teachers also struggled with giving their *students* full control of their small groups and of their learning. Kohn (1992) said that there was gratification in being in control of a situation. His point is that many current practitioners began to teach in classrooms where the expectation was that students absorbed information and then delivered it to the teacher upon demand. Cooperative learning offers students the chance to have some control over their learning. Kohn (1992) further pointed out that this change in the locus of control from teacher to student was difficult for teachers accustomed to controlling the activities within their classroom. Ms. Orange said she did not feel comfortable letting the children take control even after she and the children

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talked about the responsibilities of the people in each group. The teachers' perceived barriers were important because they could limit the teachers' use of cooperative learning with their students.

Ms. Peach, Ms. Orange, and Mr. Greene found that they were able to plan lessons that included cooperative events rather than planning cooperative lessons because they had not planned a cooperative event in several weeks. They could now let the content and the learning objectives, rather than the *calendar*, determine the instructional methodology. This represents a shift for these teachers and corroborates work by Johnson, Johnson, and Holubec (1994) who say that cooperative learning can occur between periods of whole group instruction.

Is the implementation of cooperative learning congruent with the teachers' stated conceptions?

The teachers, except for Mr. Black, planned and executed lessons that nearly matched their stated concepts of cooperative learning and those of the experts. The students participated in small group activities designed to review material or experiment to construct knowledge (Ms. Peach). In some instances, students had specific roles assigned by their teacher and other times students had no assigned roles. Students demonstrated social communication skills as they worked together and solved minor differences of opinions. Ms. Peach initiated a "talking stick" to practice turn-taking. She explained,

> "I implemented that [the talking stick] with the stipulation that all group members would have a chance to speak not no one could speak unless they held the "talking stick". I used that with the four groups. I found that the students realized the importance of taking turns and have asked to use the "talking stick". I reinforced that by using the "talking stick" when I visited each group. I gave them a marker to use as a stick. I went over the rules and the kids thought it was neat. Later, one of the groups to having trouble getting along asked me for a "talking stick".

Ms. Brown described an activity where each team member had specific jobs and the team members had to answer explicit questions at the end of the lesson. Mr. Greene stated that he liked to have the children challenge each other in game-type formats while Ms. Orange said she employed pairs and triads most of the time. The classroom observations confirmed the teachers' declarations.

Mr. Black *articulated* a definition of cooperative learning that was like that of the scholars and the other five participants. However, he further explained, he had a music background and thought of cooperative learning in symphonic terms. He saw an orchestra where each section contributed to the final piece. In practice, his definition of cooperative learning meant "turn taking" or "sharing" rather than students contributing specific components to the finished product. During two of the visits, he had guest speakers. Neither guest speaker was a certified teacher and neither practiced cooperative learning techniques as defined in this paper. The first guest speaker talked about rocks and their minerals. She passed a few specimens around for the children to hold and identify, based upon her talk. The second speaker directed the children to build their own terrariums by visiting the various stations around the room to gather needed materials, and then to return to their tables where they helped each other create individual terrariums.

Upon beginning the interview, the teachers answered a few icebreaker questions before moving into the established protocol. One of the questions asked the teacher how successful he/she thought the lesson was. After having the second of two speakers present material, Mr. Black indicated that he thought the lesson was cooperative because they shared material and helped each other create their terrariums.

In his defense, Mr. Black created and executed one cooperative learning lesson that the author observed. This lesson was aligned more nearly with the other teachers' use of cooperative learning techniques. His students seemed comfortable and the children appeared to be familiar with cooperative techniques.

Why do the fourth and fifth grade teachers implement cooperative strategies?

The most popular response was that teachers wanted the students to reinforce their learning. Cohen, Lotan, Whitcomb, Balderrama, Cossey and Swanson (1994) indicate that we learn better by verbalizing so it follows that students in cooperative groups learn by explaining concepts to each other. Mr. Greene said, "... if the kids are teaching each other they are probably doing some learning" (Ransdell, 2001). Of the 17 observed lessons, six contained new material, nine were a review of previously taught information, one was a culminating event, and one was an extension of previous learning.

The second reason teachers used cooperative learning was because of a limited supply of necessary materials for hands-on learning and to meet the needs of their kinesthetic learners. Mr. Black said, "I like to have at least one hands-on activity for each unit." Ms. Peach said, "I hope the students can learn from one another. Most of my cooperative learning lessons are hands-all in activities. ... Science makes sense as of content area for cooperative learning because it lends itself to hands-on."

Finally, the teachers saw a need for students to learn to accept diversity. These teachers felt that cooperative learning helped the students learn to live in a community while sharing resources and gaining intellectual knowledge (Ransdell, 2001). Ms. Orange said,

> "The biggest hope is that they learn social skills. That they learn to function in a group because we have to. We must be able to get along with other people. I think it makes the students more responsible. They know that I will be disappointed if they don't get the [required] work done. I hope it makes them more motivated to learn. They seem to enjoy it if they think they are running the show."

In sum, teachers claimed that cooperative learning was a good way to review for a test, to conduct a science experiment, or to extend a previous lesson. Field notes collected during the observations corroborated this information.

The author asked the educators what made each want to use cooperative learning structures again. Several teachers were animated and claimed that they found cooperative learning to be successful. Some comments reflecting the teachers' responses included, "It was fun for the students and for me." "It effectively engaged the students." In addition, "The students learn better." Teachers also mentioned, "The cooperative lessons benefited the students because it helped them prepare for real-life."

What specific structures do these teachers use when

implementing a cooperative learning lesson?

Learning Together (Johnson and Johnson, 1991) was the predominate structure in use by the teachers. Teachers used this strategy during nine observations. Teachers employed Group Investigation (Sharan and Sharan, 1994) twice. One teacher talked about having used Co-op, Co-op (Kagan, 1985) in her classroom but the incident was not witnessed. During two observations, the teachers used a game show format. The researcher identified no published cooperative learning strategy employed during three of the observations.

Discussion and Implications

Teachers in this study articulated conceptions of cooperative learning that aligned with the scholars. They indicated that cooperative learning involved small groups of students working together to complete a specific task. Often this task was to review material for an upcoming test or to conduct a science experiment. Teachers hoped that cooperative learning taught students to live in harmony with those of varied backgrounds. The teachers stated that they believed that the students in the larger (four or five students each) groups did not always need specific, interdependent roles.

How did these teachers incorporate cooperative learning? They claimed to vary the structure of the cooperative learning strategies by day and by content rather than utilizing the same structures more often. The author identified strategies attributed to Johnson and Johnson and Holubec (1993, 1994b). Two teachers employed techniques suggested by Sharan and Sharan (1994). One teacher used a format outlined by Kagan & Kagan (1995). However, the teachers frequently deleted the aspect of positive interdependence. During two observations, the respective teachers used a game show format that they created to review content. In fact, the teachers used a variety of structures.

The teachers' articulated definitions of cooperative learning differed slightly from their implementations of cooperative learning. Kagan (1985), and Johnson, Johnson, and Holubec (1993, 1994) stress the value of positive interdependence or individual roles for each member of the group. Each person contributes unique tasks to the group's effort. Each person's involvement was essential and the group functions when each person carries out his or her role. These teachers repeatedly chose not to incorporate positive interdependence. It is understandable that teachers using pairs not assign roles, but these teachers chose not to assign roles when the groups had four or five students each. Teachers assigned roles during *six* of the scheduled observations but allowed the children to decide which role to take, or assigned only some of the children a role. This finding was significant in that it indicates the teachers' 1) ignorance of expert opinion and research 2) disregard for this information, or (3) a choice made by each teacher regarding practice. Perhaps the increased level of planning needed to create cooperative learning events played a role in the teachers' decisions not to include roles for each student in the groups.

These teachers felt cooperative learning benefited the students, and that they would continue to employ cooperative strategies as they had been doing. They thought that cooperative learning could be interspersed with other methods of instruction. However, they felt they had reduced control in their classrooms and this clashed with the more familiar hierarchical teaching styles. A common format in the elementary, middle, and secondary arena was teacher-directed instruction. Cooperative learning is

highly student-participatory and the teachers seemed to feel more comfortable in an instructional environment that was more teacher-directed.

A widespread teaching methodology used in both undergraduate and graduate college courses is the lecture format (Brinkley, Dessants, Flamm, Fleming, Forcey, & Rothchild, 1999). Students expect to come to class and take notes about what the teacher said or displayed. Students learn passively via lectures or whole group teacher-directed methodologies and then take these unconscious lessons directly from their professors into their own classrooms. In Wise's (2001) words, "teachers teach as they experienced learning."

College students participate in student-arranged study groups or tutoring sessions but these arrangements often lack the structure of cooperative learning strategies. Limited-contact, in-service, or pre-service training does not provide adequate preparation in cooperative learning strategies. Individuals who participate in these sessions come away with many questions but before they can apply the strategies or have their questions fully addressed, the specialist leaves or the university course ends.

Students in teacher education programs must have *multiple* assignments that require them to use cooperative strategies, write their own lesson plans and/or actually teach the lessons using cooperative strategies. This supports the familiar adage, "Use it or lose it."

Practicing teachers who become familiar with cooperative learning through personal experience will gain confidence and may be more likely to add it to their instructional techniques. The teachers in the study stated that they learned about cooperative learning in their college coursework, but that they did not remember much about the technique. Perhaps they did not internalize the methodology.

Educators who help teacher education students and practicing teachers construct a cooperative learning schema and learn strategies help them these teachers teach their own students using cooperative strategies. It is imperative that teacher education students and practicing teachers understand the connection between theory and practice. Students unfamiliar with cooperative learning must become thoroughly familiar with the technique, its uses, its advantages, and its caveats. Perhaps when educators have successfully internalized cooperative learning, we will see cooperative strategies used more frequently in elementary classrooms.

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